What is claimed is:

1. An apparatus for enhancing the accuracy of a sensor signal output from a sensor by estimating and compensating for bias, the apparatus comprising:

a low-pass filter (LPF) operable to filter the sensor signal and output a low-frequency sensor signal;

an operation determination unit operable to determine whether the sensor is not in operation;

a bias estimating unit operable to estimate bias included in the low frequency sensor signal output from the LPF according to the output of the determination unit; and

a subtractor operable to subtract the estimated bias from the low frequency sensor signal according to the output of the operation determination unit.

2. The apparatus of claim 1, wherein the determination unit comprises:

a differentiator operable to differentiate the low frequency sensor signal;

a first window comparator operable to determine whether or not the differentiated low frequency sensor signal is included in a window of a first size;

a second window comparator operable to determine whether or not the low-frequency sensor signal is included in a window of a second size; and

a multiplier operable to multiply outputs of the first and second window comparators.

3. The apparatus of claim 2, wherein the bias estimating unit comprises:

a moving averager operable to move a window having a predetermined length along a time axis and output each average of the sensor signal corresponding to the

window;

a first storing unit operable to store the averages output from the moving averager and output the stored averages according to the output of the multiplier;

a cumulative averager operable to accumulate a predetermined number of average output from the first storing unit, and averages the accumulated averages to output as a cumulative average; and

a second storing unit operable to store the cumulative averages output from the cumulative averager and output the stored cumulative averages according to the output of the multiplier.

4. The apparatus of claim 3, wherein the window of the moving averager is the same length along a time axis as the window of the first window comparator.

5. The apparatus of claim 1, wherein the bias estimating unit comprises:

a moving averager operable to move a window having a predetermined length along a time axis and calculate each average of the sensor signal corresponding to the window;

a first storing unit operable to store the averages output from the moving averager and output the stored averages according to the output of the operation determination unit;

a cumulative averager operable to accumulate a predetermined number of average output from the first storing unit, and averages the accumulated averages to output as a cumulative average; and

a second storing unit operable to store the cumulative averages output from the cumulative averager and output the stored cumulative averages according to the

output of the determination unit.

6. An apparatus for enhancing the accuracy of a sensor signal output from a sensor by controlling a tolerance level, the apparatus comprising:

a low-pass filter (LPF) operable to filter the sensor signal and output a low-frequency sensor signal;

a determination unit operable to determine whether the sensor is not in operation;

a noise bias estimating unit operable to estimate bias caused by noise which is included in the low frequency sensor signal output from the low-pass filter, according to the output of the determination unit;

a tolerance level estimating unit operable to detect a level of the low frequency sensor signal that is higher than the estimated bias, according to the output of the operation determination unit, and estimate a tolerance level based on the detected level and the estimated bias; and

a signal discriminating unit operable to output the low frequency sensor signal when the low frequency signal exceeds the estimated tolerance level.

7. The apparatus of claim 6, wherein the determination unit comprises:

a first window comparator operable to determine whether or not the low frequency sensor signal is included in a window of a first size;

a differentiator operable to differentiate the low frequency sensor signal;

a second window comparator operable to determine whether or not the differentiated low frequency sensor signal is included in a window of a second size; and

a multiplier operable to multiply outputs of the first and second window comparators.

8. The apparatus of claim 7, wherein the noise bias estimating unit comprises:

a moving averager operable to move a window having a predetermined length along a time axis and calculate each average of the sensor signal corresponding to the window;

a first storing unit operable to store the averages output from the moving averager and output the stored averages according to the output of the multiplier;

a cumulative averager operable to accumulate a predetermined number of averages output from the first storing unit, and average the accumulated averages to output as a cumulative average; and

a second storing unit operable to store the cumulative averages output from the cumulative averager and output the stored cumulative averages according to the output of the multiplier.

9. The apparatus of claim 8, wherein the window of the moving averager is the same length along a time axis as the window of the second window comparator.

10. The apparatus of claim 6, wherein the noise bias estimating unit comprises:

a moving averager operable to move a window having a predetermined length along a time axis and calculate each average of the sensor signal corresponding to

the window;

a first storing unit operable to store the averages output from the moving averager and output the stored averages according to the output of the operation determination unit;

a cumulative averager operable to accumulate a predetermined number of average output from the first storing unit, and averages the accumulated averages to output as a cumulative average; and

a second storing unit operable to store the cumulative averages output from the cumulative averager and output the stored cumulative averages according to the output of the operation determination unit.

11. The apparatus of claim 6, wherein the tolerance level estimating unit comprises:

a level detector operable to detect and output a level of the low frequency sensor signal that is higher than the estimated noise bias, according to the output of the determination unit; and

an adder operable to add the level detected by the level detector, a predetermined bias, and the estimated noise bias, and output the result as the tolerance level.

12. The apparatus of claim 11, wherein the signal discriminating unit comprises:

a storing unit operable to store the estimated tolerance level and output the stored value according to the output of the operation determination unit;

a comparator operable to compare the low frequency sensor signal with a

signal output from the storing unit and output the compared result; and

a switch operable to open or close depending on the output value of the comparator to either output or not output the low frequency sensor signal, respectively.

13. The apparatus of claim 6, wherein the signal discriminating unit comprises:

a storing unit operable to store the estimated tolerance level and output the stored value according to the output of the operation determination unit;

a comparator operable to compare the low frequency sensor signal with the signal output from the storing unit and output the compared result; and

a switch operable to open or close depending on the output value of the comparator to either output or not output the low frequency sensor signal, respectively.

14. A method for enhancing the accuracy of a sensor signal output from a sensor by estimating and compensating for a bias in the sensor signal, the method comprising:

(a) low-pass filtering the sensor signal and outputting a low frequency sensor signal;

(b) determining whether or not the sensor is not in operation;

(c) estimating the bias included in the low frequency sensor signal when it is determined in step (b) that the sensor is not operating; and

(d) compensating for the bias by subtracting the estimated bias from the low frequency sensor signal.

15. The method of claim 14, wherein step (b) comprises:

(b1) differentiating the low frequency sensor signal; and

(b2) determining that the sensor is not operating when an amplitude of the differentiated, low frequency sensor signal is a first value or less, and an amplitude of the low frequency sensor signal is a second value or less.

16. The method of claim 14, wherein step (c) comprises:

(c1) moving a predetermined length window along a time axis, averaging the low frequency signal corresponding to the window and outputting each average when the sensor is not operating; and

(c2) accumulating a predetermined number of averages output in step (c1), averaging the accumulated averages to output as the bias, when it is determined in step (b) that the sensor is not operating.

17. A method for enhancing the accuracy of a sensor signal output from a sensor by controlling a tolerance level, the method comprising:

(a) low-pass filtering the sensor signal and outputting a low frequency sensor signal;

(b) determining whether or not the sensor is not in operation;

(c) estimating a bias due to noise included in the low frequency sensor signal when it is determined in step (b) that the sensor is not operating;

(d) detecting a level of the low frequency sensor signal that is higher than the estimated noise bias, and estimating the tolerance level using the sensed level and the noise bias, when it is determined in step (b) that the sensor is not operating; and

(e) outputting the low frequency sensor signal when the filtered sensor signal has a higher level than the tolerance level estimated in step (d).

18. The method of claim 17, wherein step (b) comprises:

(b1) differentiating the low frequency sensor signal; and

(b2) determining that the sensor is not operating when an amplitude of the differentiated, low frequency sensor signal is a first value or less, and an amplitude of the low frequency sensor signal is a second value or less.

19. The method of claim 17, wherein step (c) comprises:

(c1) moving a predetermined length window along a time axis, averaging the low frequency signal corresponding to the window and outputting each average value when the sensor is not operating; and

(c2) accumulating a predetermined number of averages output in step (c1), averaging the accumulated averages to output as the bias, when it is determined in step (b) that the sensor is not operating.

20. The method of claim 17, wherein step (d) comprises:

(d1) detecting a level of the low frequency sensor signal that is higher than a level of the noise bias estimated in step (c), when it is determined in step (b) that the sensor is not operating; and

(d2) estimating the tolerance level by adding the detected level, an externally provided bias, and the estimated noise bias.